

Washington State Employers' Workforce Training Needs and Practices



2002



Washington State
Workforce Training and Education Coordinating Board

WORKFORCE TRAINING AND EDUCATION COORDINATING BOARD

The Vision

The Workforce Training and Education Coordinating Board is Washington State's valued and trusted source of leadership for the workforce development system.

Mission Statement

The Workforce Training and Education Coordinating Board's mission is to bring business, labor, and the public sector together to shape strategies to best meet the state and local workforce and employer needs of Washington in order to create and sustain a high skill, high wage economy.

To fulfill this Mission, Board members, with the support of staff, work together to:

- Advise the Governor and Legislature on workforce development policy.
- Promote a system of workforce development that responds to the lifelong learning needs of the current and future workforce.
- Advocate for the non-baccalaureate training and education needs of workers and employers.
- Facilitate innovations in workforce development policy and practices.
- Ensure system quality and accountability by evaluating results and supporting high standards and continuous improvement.

Board Members

René Ewing
Chair

Rick Bender
Representing Labor

Geraldine Coleman
Representing Business

Beth Thew
Representing Labor

Sylvia Mundy
*Commissioner, Washington
State Employment Security
Department*

Terry Bergeson
*State Superintendent of
Public Instruction*

Earl Hale
*Executive Director, State
Board for Community and
Technical Colleges*

Tony Lee
*Representing Targeted
Populations*

Joseph J. Pinzone
Representing Business

Don Brunell
Representing Business

John McGinnis
Representing Labor

Participating Officials

Vacant
*Representing Local
Elected Officials*

Dennis Braddock
*Secretary, State Department of
Social and Health Services*

Ellen O'Brien Saunders
Executive Director

Workforce Needs and Practices Customer Satisfaction Survey

The Workforce Training and Education Coordinating Board is committed to high quality customer satisfaction and continuous improvement. You can help us meet our commitment by completing this form, detaching it, and mailing it in. Please circle the words that best answer the following questions. In the spaces provided, please elaborate on your response.

1. How useful is this report?	not useful	somewhat useful	very useful
2. How clear is this report?	not clear	somewhat clear	very clear
3. How complete is the information?	not complete	somewhat complete	very complete
4. How is the information presented?	not enough detail	right amount detail	too much detail
5. How is the length of the document?	too short	about right	too long
6. Do you want additional copies of this report? Yes ____ Quantity ____ No ____			
7. How did you expect to use this report? How have you used this report?			

8. How can this report be made more useful in future editions? What additional information would you like to see in subsequent reports?

Please Tell Us About Yourself

JOB TITLE	SECTOR Public ____ Private ____ Nonprofit ____	YOUR ZIP CODE
-----------	---	---------------

Does your organization provide training services to clients? Yes ____ No ____

Would you like to be contacted about future WTECB initiatives in this field? Yes ____ No ____

If we have any questions about what you have written here, may we contact you? Yes ____ No ____
(If you answered "yes" to this question or question #7, please fill out the following.)

NAME	ADDRESS	
TELEPHONE #	FAX#	EMAIL ADDRESS

FOLD HERE FIRST



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

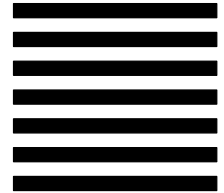
BUSINESS REPLY MAIL

FIRST-CLASS MAIL

PERMIT NO. 267

OLYMPIA WA

POSTAGE WILL BE PAID BY ADDRESSEE



WORKFORCE TRAINING & EDUCATION
COORDINATING BOARD
PO BOX 43105
OLYMPIA WA 98599-3105



FOLD HERE SECOND

DO NOT STAPLE—SEAL WITH TAPE



STATE OF WASHINGTON

Workforce Training and Education Coordinating Board

128 - 10th Avenue, S.W. • P.O. Box 43105 • Olympia, WA 98504-3105

Phone: (360) 753-5662 • Fax: (360) 586-5862 • Web: www.wtb.wa.gov • Email: wtecb@wtb.wa.gov

August 2002

Dear Governor Locke, Members of the Legislature, and Partners in the Workforce Development System:

I'm pleased to forward *Washington State Employers' Workforce Training Needs and Practices* to you for your consideration.

This report, based on 2,405 survey responses from Washington employers, presents the best available information on the workforce training needs and practices of employers in our state.

The survey results show that even during a recession there are skill shortages. Too many job applicants do not possess the type and level of education and skills that employers need. Employers most frequently report difficulty finding workers with specific occupational skills such as those taught through community and technical colleges, private career schools, and apprenticeship programs. According to employers, shortages of skilled workers have a substantial negative effect on the performance of their business.

I hope you find this report useful. Soon we will also publish *High Skills, High Wages 2002: Washington's Strategic Plan for Workforce Development*. The Plan will include strategies to address these skill shortages.

I would like to draw your attention to the customer satisfaction survey included in the report. Please let us know your views so that we can improve our service to you.

Sincerely,

Ellen O'Brien Saunders
Executive Director

Washington State Employers' Workforce Training Needs and Practices

2002



Washington State
Workforce Training and Education Coordinating Board
128 - 10th Avenue, S.W.
P.O. Box 43105
Olympia, WA 98504-3105
(360) 753-5662/Fax (360) 586-5862
<http://www.wtb.wa.gov>
Email: wtecb@wtb.wa.gov

Table of Contents

Introduction

Background	1
Survey results highlights	2

Survey Responses

Number of employers who hired new employees	3
Scarcity of skilled job applicants	4
Economic costs of skill shortages	5
Difficulty finding applicants by level of education	6
Difficulty finding workers who have certain abilities and skills	7
Employer-provided classroom training	8
Employer-provided on-the-job training	8
Future needs—increasing skill requirements	8

Appendix A

<i>Survey instrument</i>	I
--------------------------------	---

Appendix B

<i>Additional tables by industry sectors</i>	II
--	----

Appendix C

<i>Map of the workforce development areas</i>	III
---	-----

INTRODUCTION

Background

Every two years, the Workforce Training and Education Coordinating Board surveys Washington State employers. The Workforce Board uses the survey responses to identify employers' workforce training needs and practices and their satisfaction with workforce training programs. The Board shares the information with policymakers and program administrators in order to improve the workforce development system's responsiveness to employer needs. This report summarizes the survey results on training needs and practices. The survey information on employer satisfaction is published as part of a separate evaluation of the state's workforce training programs, *Workforce Training Results*.

The Workforce Board conducted the employer survey from September 2001 through February

Figure 1: Distribution of survey responses by industry sector

INDUSTRY	NUMBER OF RESPONSES
Agriculture & Food Processing	171
Services	871
Manufacturing	186
Trade	551
Construction	186
High-Tech ¹	114
Other ²	326
Total	2,405

2002. (A copy of the survey instrument is in Appendix A.) The Board mailed the survey to 12,000 employers, and 2,405 responses were received for a response rate of 20 percent. The survey was sent to a sample of private firms, government agencies, and nonprofit organizations in Washington that had at least one employee. The sample was stratified by firm size, region of the state, and industry. Sample weights were used to make the

statistics reported here representative of the 232,000 employers with one or more employee. The results shown, therefore, represent the likely results had all employers with one or more employee responded to the survey.

Figure 1 shows the number of responses received from each industry sector, and Figure 2 (on following page) shows the distribution of responses by firm size.

¹ High-tech includes biotechnology, computers and computer equipment, computer programming, software and maintenance, electronics, precision equipment and instruments, telephone communications, research, and testing.

² Other includes transportation and public utilities, communication, gas, electric and sanitary services, finance, insurance, real estate, and public administration.

Survey results: highlights

Even in a recession, employers were hiring and there were shortages of skilled job applicants.

- Sixty-five percent of Washington employers hired new employees in 2001.
- Among employers hiring, or attempting to hire new employees in 2001, 59 percent reported difficulty finding qualified job applicants.

Why was there a skill shortage during a recession? Employers were looking for skills that many of the unemployed workers and new

labor market entrants did not have. Employers reported the greatest difficulty finding job applicants with postsecondary training.

- Among employers attempting to hire workers with post-secondary vocational training (such as training offered in a community or technical college or private career school), 83 percent reported difficulty finding qualified applicants. In contrast, among employers attempting to hire workers with only a high school diploma, 37 percent reported difficulty.

Employers most frequently reported difficulty finding job applicants with specific occupational skills.

- Among employers reporting difficulty finding qualified job applicants, 91 percent had difficulty finding applicants with occupation-specific skills (e.g., they wanted to hire a web designer but had trouble finding one).
- About 85 percent had difficulty finding applicants with problem solving skills, communication skills, or positive work habits and attitudes.
- Employers less frequently had difficulty finding applicants with basic math (66 percent), writing (64 percent), or reading skills (39 percent).

Employers reported that the shortage of skilled workers negatively affected their businesses.

- Among firms reporting difficulty finding qualified job applicants, 63 percent indicated that the difficulty lowered output or sales, and 56 percent said it reduced quality.

Figure 2: Distribution of survey responses by employer size

FIRM SIZE	NUMBER OF RESPONSES
1-4 employees	1001
5-19 employees	876
20-99 employees	339
100 or more employees	161
NA	28

SURVEY RESPONSES

The following are the responses to the survey. In some cases, the responses are compared with the responses to the last survey, two years earlier. Additional breakdowns of the survey responses by industry sector are presented in Appendix B.

Number of employers who hired new employees

Question: Has your firm/organization hired any new employees in the last 12 months?

- Sixty-four percent of employers hired new employees in 2001, compared with seventy-eight percent in 1999. The decline reflects business conditions in the recession.

Figure 3: Percentage of firms reporting difficulty finding qualified job applicants by industry sector

INDUSTRY	FIRMS ATTEMPTING	
	TO HIRE ³	ALL FIRMS
Agriculture & food processing	66%	49%
Services	63%	44%
Manufacturing	60%	37%
Trade	58%	41%
Construction	48%	31%
High-tech	47%	30%
Other	61%	38%
Total	60%	41%

³ Attempting to hire refers to firms that hired new employees during the last 12 months or that did not hire because of difficulty in finding qualified applicants.

Scarcity of skilled job applicants

Question: In the last 12 months, did your firm/organization have any difficulty finding qualified applicants for any of the jobs you were trying to fill?

- Sixty percent of firms attempting to hire workers during the last twelve months had difficulty finding qualified job applicants. This represents an estimated 89,300 or 41 percent of employers in the state. In 1999, 64 percent of firms attempting to hire had difficulty.
- Compared to 1999, difficulty in finding workers declined most in the construction and high-tech industries and among larger firms. Difficulty increased in the agriculture and food processing industries.⁴
- Difficulty in finding qualified workers was not isolated to particular sectors, and both small and large firms faced this problem.

Figure 4: Percentage of firms reporting difficulty finding qualified job applicants by size of firm

INDUSTRY	FIRMS ATTEMPTING TO HIRE	ALL FIRMS
1-4 employees	57%	30%
5-19 employees	61%	51%
20-99 employees	63%	59%
100 or more employees	69%	69%

Figure 5: Percentage of firms reporting difficulty finding qualified applicants by workforce development area⁵

WORKFORCE DEVELOPMENT AREA	FIRMS REPORTING DIFFICULTY AMONG FIRMS ATTEMPTING TO HIRE
King County	71%
Pacific Mountain	69%
Benton Franklin	61%
Olympic	61%
Snohomish County	61%
Eastern Washington	54%
Pierce County	54%
Tri-County	51%
Spokane	47%
Southwest Washington	45%
Northwest Washington	43%
North Central WA	42%
Total	60%

⁴ Appendix B contains additional tables by industry sectors.

⁵ Washington is divided into 12 workforce development areas. See Appendix C for a map showing the location of each area.

- Employers in all areas of Washington State reported difficulty, but the most severe scarcity was reported by those in King County and the Pacific Mountain area (Grays Harbor, Mason, Lewis, Thurston, and Pacific Counties).

Economic costs of skill shortages

Question: How did your firm/organization respond to the difficulty finding qualified applicants?

- Faced with a shortage of qualified applicants, firms increased recruiting efforts, hired less qualified workers, and left openings unfilled.

Question: Which of the following has resulted from your firm's difficulty in finding qualified applicants?

- Employers believed skill shortages were hurting their businesses by lowering productivity, limiting output or sales, and reducing product quality. Impacts on productivity, output, and service quality were more common in 1999 when skill shortages were more common.

Figure 6: Employer responses to the shortage of qualified applicants

RESPONSE	AMONG FIRMS THAT HAD DIFFICULTY	ALL FIRMS
Increased recruiting efforts	72%	24%
Hired a less qualified applicant	67%	24%
Increased overtime for employees	56%	18%
Did not fill the opening	48%	17%
Increased wages to attract applicants	46%	15%
Outsourced the work/service	25%	8%

Figure 7: Economic impacts of skill shortages

IMPACT	AMONG FIRMS THAT HAD DIFFICULTY	ALL FIRMS
Lowered overall productivity	63%	25%
Reduced production output or sales	63%	24%
Reduced product or service quality	56%	22%
Prevented firm from expanding its facilities	36%	14%
Prevented firm from developing new products/services	33%	13%
Caused firm to move some operations out of Washington	3%	1%

Difficulty finding applicants by level of education

Question: In general, how much difficulty has your firm/organization experienced in the last 12 months finding qualified applicants with the different education levels listed below?

- The problem is the scarcity of workers with postsecondary training, as opposed to a general shortage. Difficulty in finding workers with only a high school diploma, a GED, or without these credentials has declined since 1999.
- Given hiring patterns across firms and levels of reported difficulty, the scarcity of workers with post-secondary *vocational* training affected more firms than were affected by shortages of other workers. An estimated 33,693 firms (18 percent of all firms) had difficulty in finding applicants with vocational certificates or vocational associate degrees.

Figure 8: Employer Difficulty Finding Applicants by Educational Level

EDUCATIONAL LEVEL	FIRMS ATTEMPTING TO HIRE AT THAT LEVEL	ALL FIRMS	ESTIMATED NUMBER OF FIRMS
Neither a high school diploma or GED	29%	6%	9,700
High school diploma or GED	37%	11%	21,000
Some college course work	67%	16%	29,500
Vocational certificate	83%	18%	31,700
Vocational associate degree	83%	13%	22,300
Academic associate degree	79%	12%	19,100
Baccalaureate degree	81%	13%	22,100
Master's, doctoral or professional degree	91%	9%	13,800

- An estimated 26,078 firms (15 percent of all firms) had difficulty in finding applicants with baccalaureate, master's, doctoral, or professional degrees.
- Compared with 1999 responses, difficulty increased most at the master's, doctoral or professional degree level; the vocational associate degree level; and the academic associate degree level.

Difficulty finding workers who have certain abilities and skills

Question: How much difficulty has your firm/organization had finding employees with the following skills?

- Firms found it most difficult to find applicants with the necessary occupation-specific skills.
- Firms also found it difficult to find applicants with problem solving or critical thinking skills, communication skills, and positive work habits.
- Compared with 1999 responses, fewer firms had difficulty finding teamwork and computer skills. More firms had difficulty finding workers with writing skills.

Figure 9: Firms reporting difficulty finding qualified applicants with specific skills and abilities

TYPE OF SKILL OR ABILITY	AMONG FIRMS THAT HAD DIFFICULTY	ALL FIRMS
Occupation-specific skills	91%	33%
Problem solving or critical thinking skills	88%	31%
Communication skills	84%	30%
Positive work habits and attitudes	84%	31%
Ability to adapt to changes in duties and responsibilities	82%	29%
Teamwork skills	76%	28%
Ability to accept supervision	72%	26%
Computer skills	68%	18%
Math skills	66%	22%
Writing skills	64%	22%
Reading skills	39%	13%

Employer-provided classroom training

Question: Did your firm/organization provide or pay for any classroom training, workshops, or seminars (lasting at least four hours) for any employees in the last 12 months?

- Almost one-half (48 percent) of firms provided or paid for some classroom training.
- There are three broad categories of classroom training—training in work place practices, basic skills training (reading, writing, math, and English language skills), and training in job-specific skills. Among the firms that provided classroom training, 84 percent provided such training in job-specific skills, 73 percent provided it for work place practices, and 17 percent provided it for basic skills.
- Forty-one percent of firms reported that the percentage of their workers who received classroom training increased during the past three years. Firms increased classroom training for a number of reasons—the need to improve quality, changes in technology, and a desire to promote the career development of employees were most often cited.

- Forty percent of firms had tuition reimbursement programs for their employees.
- The incidence of classroom training varied by occupation. It was especially high among managers and professional staff.

Employer-provided on-the-job training

Question: Did your firm/organization provide at least 4 hours of on-the-job training that was described in a written plan or agreement for any employee during the past 12 months?

- Thirty-five percent of firms provided at least four hours of on-the-job training (OJT) described in a written plan or agreement.
- This question was revised for 2001. In 1999, 83 percent of employers reported that they provided on-the-job training when it was defined as “learning from someone else the duties that the job requires while performing work.”
- The incidence of on-the-job training also varied by occupation. Employers offered OJT more frequently than classroom training to their clerical and

administrative support staff, and to workers in service, production, construction, operation, and maintenance occupations.

Future needs—increasing skill requirements

- Forty-six percent of firms reported that the skills required to adequately perform production or support jobs increased in the last three years. This is consistent with results from the last survey.
- One reason that skill requirements increased is that computer usage has become common. Forty-nine percent of non-supervisory employees used computers in their jobs.
- Another factor that increases skill requirements is the adoption of high-performance work organization practices—89 percent of firms cross-trained employees to do a number of jobs, 69 percent organized regular meetings with workers to discuss ways to improve practices, 65 percent linked pay to performance, and 46 percent compared performance with that of other firms (benchmarking).

Question: How will your firm's need for employees with each of the types of education listed below change in the next five years?

- Skill requirements will continue to increase. As a result, many firms reported their need for workers with postsecondary training would increase during the next five years.
- Employer projections of skill requirements are similar to those made in 1999. The biggest changes are an increased expected need for vocational associate degrees and for master's, doctoral, or professional degrees.

Figure 10: Employer expectations of future employment needs by educational level

EDUCATIONAL LEVEL	INCREASE	STAY ABOUT THE SAME	DECREASE
Neither a high school diploma or GED	10%	75%	15%
High school diploma or GED	19%	75%	6%
Some college course work	31%	68%	2%
Vocational certificate	38%	59%	3%
Vocational associate degree	32%	65%	3%
Academic associate degree	25%	73%	2%
Baccalaureate degree	30%	68%	2%
Master's, doctoral or professional degree	27%	70%	3%

APPENDIX A

Survey instrument

**Workforce Training: Needs & Practices
of Washington State Employers
2001 Short Form**

Questionnaire #

--	--	--	--	--	--

Office Use Only

**SECTION A: RECENT HIRING AND DIFFICULTIES IN FINDING
QUALIFIED APPLICANTS**

These first questions are about whether you have hired new employees in the last 12 months and about any difficulties you may have experienced in finding qualified applicants.

1. Has your firm/organization hired any new employees in the last 12 months?

- ☐ Yes
☐ No

2. Please give your best estimate of the number of job openings you tried to fill in the last 12 months.

_____ USE THREE-DIGIT FORMAT. FOR EXAMPLE, 5 WOULD BE
ENTERED 005, AND 50 WOULD BE ENTERED 050.

3. In the last 12 months, did your firm/organization have any difficulty finding qualified applicants for any of the jobs you were trying to fill?

- ☐ Yes
☐ No -- SKIP TO PAGE 3, SECTION B

4. How did your firm/organization respond to the difficulty finding qualified applicants?
MORE THAN ONE RESPONSE IS POSSIBLE. PLEASE INDICATE YES OR NO FOR EACH
STATEMENT.

- | | | |
|---|---------------------------|--------------------------|
| a. Did not fill the job opening..... | <input type="radio"/> Yes | <input type="radio"/> No |
| b. Hired a less qualified applicant..... | <input type="radio"/> Yes | <input type="radio"/> No |
| c. Outsourced work or purchased services from another firm..... | <input type="radio"/> Yes | <input type="radio"/> No |
| d. Increased overtime hours of current workers..... | <input type="radio"/> Yes | <input type="radio"/> No |
| e. Increased recruiting efforts (e.g., advertised more widely)..... | <input type="radio"/> Yes | <input type="radio"/> No |
| f. Increased wages to attract more applicants..... | <input type="radio"/> Yes | <input type="radio"/> No |
| g. Other, specify: _____ | | |

--	--	--

Office Use Only

5. Please indicate the occupation for which your firm/organization had the most difficulty finding qualified applicants in the last 12 months.

--	--	--

Office Use Only



Workforce Training: Needs & Practices of Washington State Employers

Questionnaire #

--	--	--	--	--	--

Office Use Only

6. Sometimes firms/organizations may experience difficulty in finding qualified applicants with the formal education required to perform certain jobs. In general, how much difficulty has your firm/organization experienced in the last 12 months finding qualified applications with the different education levels listed below? PLEASE FILL IN ONLY ONE CIRCLE IN EACH ROW. IF YOU DID NOT NEED EMPLOYEES WITH THAT LEVEL OF EDUCATION, FILL IN THE CIRCLE FOR "NOT APPLICABLE" IN THAT ROW.

	Much Difficulty	Some Difficulty	No Difficulty	Not Applicable
a. Neither a high school diploma nor a GED.....	①	②	③	④
b. A high school diploma or GED.....	①	②	③	④
c. Some college course work beyond high school.....	①	②	③	④
d. A vocational diploma or certificate.....	①	②	③	④
e. A vocational associate degree.....	①	②	③	④
f. An academic associate (A.A. or A.S.) degree.....	①	②	③	④
g. A baccalaureate (B.A. or B.S.) degree.....	①	②	③	④
h. A master's (M.A. or M.S.), doctoral (Ph.D) or professional degree from a college or university.....	①	②	③	④

7. Firms/organizations may also experience difficulty finding qualified applicants with certain kinds of abilities and job skills. How much difficulty has your firm/organization had finding employees with the following skills?

	Much Difficulty	Some Difficulty	No Difficulty	Not Applicable
a. Reading skills.....	①	②	③	④
b. Writing skills.....	①	②	③	④
c. Math skills.....	①	②	③	④
d. Occupation-specific skills.....	①	②	③	④
e. Computer skills.....	①	②	③	④
f. Team work skills.....	①	②	③	④
g. Problem solving or critical thinking skills.....	①	②	③	④
h. Communication skills.....	①	②	③	④
i. Positive work habits and attitudes.....	①	②	③	④
j. Ability to accept supervision.....	①	②	③	④
k. Ability to adapt to changes in duties and responsibilities.....	①	②	③	④



Workforce Training: Needs & Practices of Washington State Employers

Questionnaire #

--	--	--	--	--	--

Office Use Only

8. Which of the following has resulted from your firm's difficulty finding qualified applicants?
PLEASE INDICATE YES OR NO FOR EACH STATEMENT.

- a. Lowered overall productivity..... ☐ Yes ☐ No
- b. Reduced product or service quality..... ☐ Yes ☐ No
- c. Reduced production output or sales..... ☐ Yes ☐ No
- d. Prevented your firm/organization from expanding its facilities..... ☐ Yes ☐ No
- e. Prevented your firm/organization from developing new products/services..... ☐ Yes ☐ No
- f. Caused your firm/organization to move some operations out of Washington State..... ☐ Yes ☐ No

SECTION B: FUTURE NEEDS FOR SKILLED EMPLOYEES

9. Now we would like you to think about future needs of your firm/organization. How will your firm's/organization's need for employees with each of the types of education listed below change in the next five years?

Employees with...	Increase	Stay About the Same	Decrease	Not Needed
a. Neither a high school diploma nor a GED.....	①	②	③	④
b. A high school diploma or GED.....	①	②	③	④
c. Some college course work beyond high school.....	①	②	③	④
d. A vocational diploma or certificate.....	①	②	③	④
e. A vocational associate degree.....	①	②	③	④
f. An academic associate (A.A. or A.S.) degree.....	①	②	③	④
g. A baccalaureate (B.A. or B.S.) degree.....	①	②	③	④
h. A master's (M.A. or M.S.), doctoral (Ph.D) or professional degree from a college or university.....	①	②	③	④



50904

Workforce Training: Needs & Practices of Washington State Employers

Questionnaire #

--	--	--	--	--	--

Office Use Only

SECTION C: EMPLOYEE TRAINING YOU PROVIDE

10. In the last three years, have the skills required to adequately perform production or support jobs (primary or front-line services or support jobs) increased, decreased or remained the same?

- ☐ Increased
- ☐ Remained the Same
- ☐ Decreased

CLASSROOM TRAINING THAT YOU PROVIDE

These next questions are about classroom training, workshops, or seminars your firm/organization uses to train its employees. Please count only types of training that last four hours or longer (a half day). This training may be offered at the worksite or at another location and may occur during the working hours or at other times. These may be conducted either by personnel from your firm/organization or by sources outside your firm/organization. Examples include seminars, lectures, workshops, or audio-visual presentations. If you provide no classroom training, please answer the next question and skip to question 13, which asks about on-the-job training.

11. Did your firm/organization provide or pay for any classroom training, workshops, or seminars (lasting at least four hours) for any employees in the last 12 months?

- ☐ Yes
- ☐ No -- SKIP TO QUESTION 13

12. Did your firm/organization have a tuition reimbursement program for any employee during the past 12 months?

- ☐ Yes
- ☐ No

ON-THE-JOB TRAINING THAT YOU PROVIDE

This next question refers to on-the-job training. During on-the-job training, the worker is learning from someone else the duties that the job requires while performing work. We are specifically interested in the extent to which firms provide on-the-job training that includes a formal plan or agreement. In answering this question, please include all employees: full-time, part-time, temporary, seasonal, salaried, and hourly.

13. Did your firm/organization provide at least 4 hours of on-the-job training that was described in a written plan or agreement for any employees in the last 12 months?

- ☐ Yes
- ☐ No

APPENDIX B

*Additional tables
by industry sectors*

APPENDIX B

Additional tables by industry sectors

Question: How did your firm/organization respond to the difficulty finding qualified applicants?

Q4: Percentage among firms with difficulty

	AG. FOOD	CONSTRUC- TION	HIGH- TECH	MANU- FACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Increased recruiting efforts	55%	36%	78%	64%	79%	68%	75%	72%
Hired a less qualified applicant	79%	77%	54%	69%	60%	81%	55%	67%
Increased overtime for employees	59%	60%	49%	66%	47%	65%	56%	56%
Did not fill the opening	51%	68%	54%	43%	47%	47%	43%	48%
Increased wages to attract applicants	65%	34%	35%	50%	45%	45%	52%	46%
Outsourced the work/service	27%	46%	56%	54%	23%	15%	28%	25%

Q4: Percentage of all firms

	AG. FOOD	CONSTRUC- TION	HIGH- TECH	MANU- FACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Increased recruiting efforts	21%	9%	21%	20%	30%	22%	21%	24%
Hired a less qualified applicant	34%	21%	16%	23%	24%	29%	17%	24%
Increased overtime for employees	23%	16%	15%	21%	17%	21%	15%	18%
Did not fill the opening	23%	18%	15%	14%	18%	16%	13%	17%
Increased wages to attract applicants	25%	8%	9%	16%	16%	14%	16%	15%
Outsourced the work/service	20%	11%	17%	18%	9%	5%	7%	8%

Question: Which of the following has resulted from your firm's difficulty in finding qualified applicants?

Q8: Percentage among firms with difficulty

	AG. FOOD	CONSTRUC- TION	HIGH- TECH	MANU- FACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Lowered overall productivity	71%	82%	56%	73%	58%	65%	65%	63%
Reduced product or service quality	66%	91%	69%	80%	52%	73%	56%	63%
Reduced production output or sales	53%	62%	47%	59%	53%	60%	55%	56%
Prevented firm from expanding its facilities	30%	53%	32%	22%	37%	39%	26%	56%
Prevented firm from developing new products/services	25%	41%	33%	28%	36%	34%	24%	36%
Caused firm to move some operations out of Washington	5%	4%	17%	5%	5%	1%	1%	3%

Q8: Percentage of all firms

	AG. FOOD	CONSTRUC- TION	HIGH- TECH	MANU- FACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Lowered overall productivity	34%	26%	17%	25%	25%	25%	22%	25%
Reduced product or service quality	30%	28%	19%	28%	28%	29%	19%	24%
Reduced production output or sales	26%	20%	13%	21%	21%	23%	17%	22%
Prevented firm from expanding its facilities	13%	16%	10%	8%	8%	15%	8%	14%
Prevented firm from developing new products/services	11%	12%	10%	10%	16%	13%	8%	13%
Caused firm to move some operations out of Washington	2%	1%	17%	2%	2%	1%	1%	1%

Question: In general, how much difficulty has your firm/organization experienced in the last 12 months finding qualified applicants with the different education levels listed below? (Percentage of firms having difficulty hiring, among firms hiring at that educational level.)

Q6a: Percentage of firms with difficulty finding applicants without high school/GED diploma

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	11%	1%	0%	8%	3%	2%	2%	3%
Somewhat difficult	29%	27%	33%	16%	21%	33%	15%	26%
Not difficult	60%	72%	67%	76%	77%	65%	83%	72%

Q6b: Percentage of firms with difficulty finding applicants with high school/GED diploma

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	14%	3%	4%	7%	1%	14%	4%	6%
Somewhat difficult	37%	32%	32%	28%	26%	42%	26%	31%
Not difficult	50%	65%	64%	65%	73%	44%	44%	63%

Q6c: Percentage of firms with difficulty finding applicants with some college coursework, no degree

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	16%	12%	0%	9%	19%	30%	11%	19%
Somewhat difficult	64%	67%	0%	54%	46%	47%	50%	48%
Not difficult	20%	21%	100%	37%	35%	23%	38%	33%

Q6d: Percentage of firms with difficulty finding applicants with vocational certificate

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	36%	18%	12%	35%	33%	42%	32%	34%
Somewhat difficult	58%	78%	42%	50%	50%	38%	46%	49%
Not difficult	6%	5%	46%	15%	17%	20%	22%	17%

Q6e: Percentage of firms with vocational associate degree

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	37%	33%	10%	25%	38%	44%	25%	37%
Somewhat difficult	57%	66%	41%	55%	47%	40%	29%	46%
Not difficult	6%	0%	49%	20%	15%	16%	45%	18%

Q6f: Percentage of firms with difficulty finding applicants with academic associate degree

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	39%	92%	0%	20%	36%	31%	14%	32%
Somewhat difficult	47%	8%	39%	57%	49%	42%	49%	47%
Not difficult	15%	1%	61%	23%	15%	26%	37%	21%

Q6g: Percentage of firms with difficulty finding applicants with BA/BS degree

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	60%	67%	27%	13%	44%	54%	32%	42%
Somewhat difficult	20%	31%	27%	72%	36%	30%	53%	39%
Not difficult	20%	3%	47%	14%	20%	16%	15%	19%

Q6h: Percentage of firms with difficulty finding applicants with master's, doctoral, or professional degree

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	70%	88%	67%	31%	50%	63%	58%	54%
Somewhat difficult	18%	12%	22%	56%	44%	29%	22%	37%
Not difficult	13%	0%	11%	14%	6%	7%	20%	18%

*Question: In general, how much difficulty has your firm/organization experienced in the last 12 months finding qualified applicants with the different education levels listed below? (Percentage of firms having difficulty hiring, **among all firms.**)*

Q6a: Percentage of firms with difficulty finding applicants without HS/GED diploma	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	4%	0%	0%	2%	0%	0%	0%	1%
Somewhat difficult	10%	5%	5%	4%	4%	4%	2%	5%
Not difficult	22%	13%	9%	17%	14%	14%	12%	15%
Did not hire/respond to question	65%	81%	86%	77%	81%	75%	87%	80%

Q6b: Percentage of firms with difficulty finding applicants with HS/GED diploma	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficulty	5%	1%	1%	2%	0%	4%	1%	2%
Somewhat difficulty	14%	7%	6%	8%	8%	12%	7%	9%
Not difficult	20%	14%	12%	19%	24%	13%	21%	19%
Did not hire/respond to question	61%	78%	81%	71%	68%	71%	71%	70%

Q6c: Percentage of firms with difficulty finding applicants with some college coursework, no degree	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	4%	2%	0%	2%	5%	6%	3%	5%
Somewhat difficult	16%	9%	0%	13%	13%	10%	12%	11%
Not difficult	6%	3%	18%	9%	11%	5%	10%	8%
Did not hire/respond to question	74%	87%	82%	76%	71%	79%	76%	76%

Q6d: Percentage of firms with difficulty finding applicants with vocational certificate	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	9%	4%	2%	7%	9%	7%	5%	7%
Somewhat difficult	15%	15%	7%	10%	13%	7%	8%	11%
Not difficult	3%	1%	8%	3%	5%	4%	4%	4%
Did not hire/respond to question	72%	80%	83%	80%	73%	82%	82%	78%

Q6e: Percentage of firms with difficulty finding applicants with vocational associate degree

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	8%	6%	1%	3%	8%	5%	3%	6%
Somewhat difficult	13%	10%	6%	7%	10%	5%	3%	7%
Not difficult	1%	0%	7%	3%	4%	2%	5%	3%
Did not hire/respond to question	78%	84%	86%	86%	78%	87%	89%	84%

Q6f: Percentage of firms with difficulty finding applicants with academic associate degree

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	6%	4%	0%	3%	8%	3%	2%	5%
Somewhat difficult	7%	0%	6%	8%	1%	3%	6%	7%
Not difficult	2%	0%	10%	4%	4%	2%	5%	3%
Did not hire/respond to question	85%	96%	84%	85%	78%	92%	87%	85%

Q6g: Percentage of firms with difficulty finding applicants with BA/BS degree

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	8%	1%	5%	2%	11%	4%	5%	7%
Somewhat difficult	2%	0%	5%	8%	9%	2%	8%	6%
Not difficult	3%	0%	9%	2%	5%	1%	3%	3%
Did not hire/respond to question	87%	98%	80%	88%	74%	93%	84%	84%

Q6h: Percentage of firms with difficulty finding applicants with MA/PhD/professional degree

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	9%	1%	9%	2%	8%	3%	5%	5%
Somewhat difficult	2%	0%	3%	3%	7%	1%	2%	4%
Not difficult	2%	0%	1%	1%	1%	0%	2%	1%
Did not hire/respond to question	86%	99%	87%	95%	84%	95%	92%	90%

*Question: How much difficulty has your firm/organization had finding employees with the following skills?
(Among firms with difficulty finding qualified applicants.)*

Q7a: Percentage of firms with difficulty finding applicants with sufficient reading skills	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	9%	3%	0%	3%	1%	18%	3%	7%
Somewhat difficult	33%	41%	26%	48%	23%	39%	35%	32%
Not difficult	57%	56%	74%	49%	77%	43%	62%	62%

Q7b: Percentage of firms with difficulty finding applicants with sufficient writing skills	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	23%	11%	10%	3%	6%	27%	14%	14%
Somewhat difficult	44%	53%	38%	56%	50%	45%	53%	49%
Not difficult	33%	36%	52%	41%	43%	28%	33%	36%

Q7c: Percentage of firms with difficulty finding applicants with sufficient math skills	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	24%	9%	13%	22%	4%	30%	9%	15%
Somewhat difficult	47%	63%	36%	51%	45%	53%	57%	51%
Not difficult	29%	27%	52%	27%	51%	17%	34%	35%

Q7d: Percentage of firms with difficulty finding applicants with sufficient job-specific skills	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	56%	50%	43%	57%	36%	48%	40%	42%
Somewhat difficult	36%	50%	45%	39%	49%	46%	58%	49%
Not difficult	8%	1%	12%	3%	16%	6%	3%	9%

Q7e: Percentage of firms with difficulty finding applicants with sufficient computer skills

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	12%	13%	12%	16%	8%	22%	9%	12%
Somewhat difficult	48%	57%	39%	48%	52%	53%	70%	56%
Not difficult	40%	31%	48%	36%	40%	25%	21%	32%

Q7f: Percentage of firms with difficulty finding applicants with sufficient team work skills

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	21%	16%	5%	10%	20%	16%	20%	18%
Somewhat difficult	58%	65%	66%	62%	54%	64%	54%	58%
Not difficult	21%	20%	29%	28%	26%	20%	26%	24%

Q7g: Percentage of firms with difficulty finding applicants with sufficient problem-solving skills

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	37%	34%	22%	29%	26%	38%	37%	32%
Somewhat difficult	52%	63%	67%	65%	56%	55%	52%	56%
Not difficult	11%	3%	11%	6%	17%	8%	11%	12%

Q7h: Percentage of firms with difficulty finding applicants with sufficient communication skills

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	24%	35%	16%	10%	21%	35%	24%	26%
Somewhat difficult	55%	45%	54%	73%	61%	54%	62%	58%
Not difficult	21%	20%	29%	17%	18%	11%	15%	16%

Q7i: Percentage of firms with difficulty finding applicants with good work habits

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	12%	13%	12%	16%	8%	22%	9%	12%
Somewhat difficult	48%	57%	39%	48%	52%	53%	70%	56%
Not difficult	40%	31%	48%	36%	40%	25%	21%	32%

Q7j: Percentage of firms with difficulty finding applicants with sufficient ability to accept supervision

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	22%	22%	17%	6%	14%	25%	23%	19%
Somewhat difficult	45%	57%	39%	61%	53%	56%	44%	53%
Not difficult	33%	21%	44%	32%	33%	19%	34%	29%

Q7k: Percentage of firms with difficulty finding applicants with sufficient ability to adapt to changes

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	17%	26%	12%	17%	20%	28%	24%	23%
Somewhat difficult	54%	47%	51%	74%	60%	61%	55%	59%
Not difficult	29%	27%	37%	9%	20%	11%	21%	18%

*Question: How much difficulty has your firm/organization had finding employees with the following skills?
(Among all firms.)*

Q7a: Percentage of firms with difficulty finding applicants with sufficient reading skills

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	4%	1%	0%	1%	0%	6%	1%	2%
Somewhat difficult	14%	10%	7%	15%	9%	14%	11%	11%
Not difficult	25%	14%	20%	17%	30%	16%	21%	22%
Did not hire/respond to question	57%	76%	73%	67%	62%	64%	68%	65%

Q7b: Percentage of firms with difficulty finding applicants with sufficient writing skills

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	9%	3%	3%	1%	2%	9%	4%	5%
Somewhat difficult	17%	13%	10%	18%	19%	16%	17%	17%
Not difficult	15%	9%	14%	14%	17%	11%	10%	13%
Did not hire/respond to question	59%	75%	73%	66%	62%	64%	69%	65%

Q7c: Percentage of firms with difficulty finding applicants with sufficient math skills

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	9%	2%	3%	6%	1%	10%	3%	5%
Somewhat difficult	19%	16%	9%	15%	16%	19%	18%	17%
Not difficult	11%	7%	13%	9%	18%	7%	12%	12%
Did not hire/respond to question	60%	75%	74%	69%	65%	64%	67%	66%

Q7d: Percentage of firms with difficulty finding applicants with sufficient job-specific skills

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	25%	14%	12%	20%	14%	16%	14%	15%
Somewhat difficult	17%	14%	13%	14%	19%	16%	19%	18%
Not difficult	4%	0%	3%	2%	7%	2%	1%	4%
Did not hire/respond to question	55%	72%	72%	65%	61%	65%	65%	64%

Q7e: Percentage of firms with difficulty finding applicants with sufficient computer skills

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	5%	2%	3%	5%	3%	6%	3%	4%
Somewhat difficult	16%	8%	10%	15%	18%	14%	24%	17%
Not difficult	13%	4%	13%	12%	14%	7%	7%	10%
Did not hire/respond to question	66%	87%	74%	68%	66%	74%	74%	70%

Q7f: Percentage of firms with difficulty finding applicants with sufficient team work skills

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	8%	4%	1%	3%	8%	6%	7%	7%
Somewhat difficult	24%	17%	17%	21%	21%	22%	18%	21%
Not difficult	8%	5%	8%	10%	11%	7%	10%	9%
Did not hire/respond to question	60%	74%	74%	66%	60%	65%	65%	64%

Q7g: Percentage of firms with difficulty finding applicants with sufficient problem-solving skills

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	15%	10%	6%	9%	11%	14%	11%	11%
Somewhat difficult	23%	17%	19%	21%	23%	20%	17%	20%
Not difficult	4%	1%	3%	2%	7%	3%	4%	5%
Did not hire/respond to question	57%	73%	72%	67%	60%	64%	68%	64%

Q7h: Percentage of firms with difficulty finding applicants with sufficient communication skills

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	10%	9%	5%	3%	8%	12%	7%	9%
Somewhat difficult	25%	12%	15%	25%	24%	19%	20%	21%
Not difficult	9%	6%	8%	6%	8%	4%	5%	6%
Did not hire/respond to question	55%	73%	72%	65%	59%	64%	68%	64%

Q7i: Percentage of firms with difficulty finding applicants with good work habits

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	16%	11%	3%	12%	14%	16%	12%	14%
Somewhat difficult	22%	15%	14%	18%	19%	17%	14%	17%
Not difficult	8%	3%	11%	5%	9%	5%	6%	7%
Did not hire/respond to question	54%	71%	72%	65%	59%	62%	68%	63%

Q7j: Percentage of firms with difficulty finding applicants with sufficient ability to accept supervision

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	10%	6%	5%	2%	6%	9%	7%	7%
Somewhat difficult	20%	15%	11%	22%	22%	20%	13%	19%
Not difficult	15%	5%	12%	12%	14%	8%	12%	11%
Did not hire/respond to question	55%	74%	72%	64%	59%	64%	68%	63%

Q7k: Percentage of firms with difficulty finding applicants with sufficient to adapt to changes

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Very difficult	7%	7%	3%	6%	8%	10%	7%	8%
Somewhat difficult	24%	13%	14%	25%	24%	21%	16%	21%
Not difficult	13%	7%	10%	4%	9%	4%	8%	7%
Did not hire/respond to question	56%	73%	73%	66%	59%	65%	69%	64%

Question: How will your firm's need for employees with each type of education change in the next few years?

Q9a: All firms
Needs for workers with neither a high school diploma or GED

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Increase	8%	6%	4%	6%	11%	11%	8%	10%
Stay about the same	79%	92%	80%	83%	78%	71%	63%	75%
Decrease	12%	2%	16%	11%	11%	18%	29%	15%

Q9b: All firms
Needs for workers with high school diploma or GED

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Increase	13%	12%	12%	14%	17%	31%	11%	19%
Stay about the same	82%	87%	81%	82%	77%	67%	75%	75%
Decrease	6%	0%	6%	4%	6%	2%	14%	6%

Q9c: All firms
Needs for workers with some college work

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Increase	22%	15%	28%	24%	34%	34%	26%	31%
Stay about the same	77%	79%	68%	76%	65%	65%	72%	68%
Decrease	1%	6%	4%	0%	1%	2%	2%	2%

Q9d: All firms
Needs for workers with vocational certificate

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Increase	35%	47%	29%	33%	41%	39%	31%	38%
Stay about the same	65%	52%	68%	66%	58%	60%	60%	59%
Decrease	0%	1%	3%	1%	2%	2%	9%	3%

Q9e: All firms*Needs for workers with vocational associate degree*

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Increase	35%	34%	18%	22%	38%	31%	26%	32%
Stay about the same	63%	65%	81%	77%	61%	68%	64%	65%
Decrease	2%	1%	1%	1%	1%	2%	10%	3%

Q9f: All firms*Needs for workers with academic associate degree*

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Increase	15%	5%	20%	19%	34%	14%	28%	25%
Stay about the same	81%	79%	79%	78%	65%	85%	71%	73%
Decrease	3%	15%	1%	4%	2%	1%	1%	2%

Q9g: All firms*Needs for workers with baccalaureate degree*

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Increase	16%	8%	34%	33%	38%	18%	28%	30%
Stay about the same	84%	70%	66%	63%	61%	81%	69%	68%
Decrease	1%	21%	0%	4%	1%	2%	3%	2%

Q9h: All firms*Needs for workers with master's, doctoral, or professional degree*

	AG. FOOD	CONSTRUCTION	HIGH-TECH	MANUFACTURING	SERVICES	TRADE	OTHER	ALL INDUSTRIES
Increase	21%	6%	32%	17%	33%	16%	25%	27%
Stay about the same	78%	74%	64%	77%	65%	80%	70%	70%
Decrease	2%	20%	5%	7%	1%	4%	5%	3%

APPENDIX C

*Map of the workforce
development areas*

Workforce Development Areas

